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Emergency Pandemic Control
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Hospital Pandemic Preparedness

Just over one hundred years ago, the H1N1 influenza virus, sometimes called the "Spanish flu," swept across the world. It is estimated that approximately five hundred million people (one third of the world's population at that time) were infected, with an estimated fifty million deaths. (Center for Disease Control and Prevention, 2019) While there have been significant advancements in technology, healthcare and communication since the influenza pandemic of 1918, other aspects of our world today have actually worked to increase the risk for pandemics. These factors include population growth and urbanization, climate change, deforestation, increased international travel, and the emergence of new pathogens. (Quick & Fryer, 2018) International travel is one of the key risk factors for a pandemic. It means that any contagious illness, any virus with human to human spread, is no longer limited to the region where it began. (World Health Organization, 2020) The emergence of the SARS-nCoV-2, more commonly known as COVID-19, has highlighted the vulnerability of the world to pandemics.

While in certain aspects, it may seem as though the world was caught off guard by COVID-19, the scientific community has long been at work to try to identify and prevent outbreaks. For example, the World Health Organization (WHO) has a list of potential pandemic causing diseases to help focus research and development of treatment and vaccines. This list includes: COVID-19, Crimean-Congo hemorrhagic fever, Ebola and Marburg virus diseases, Lassa fever, Middle East respiratory syndrome coronavirus (MERS-CoV), Severe Acute Respiratory Syndrome (SARS), Nipah and henipaviral diseases, Rift Vallley fever, Zika, and "Disease X" (the unknown, unforeseen pathogen). (World Health Organization, 2020) As Dr. Jonathan Quick wrote in his book, *The End of Epidemics: the Looming Threat to Humanity and How to Stop It:*

> "Scientists don't know which microbe it will be, where it will come from, or whether it will be transmitted through the air, by touch, through body fluids, or through a combination of routes, but they do know that epidemics behave a bit like earthquakes. Scientists know that a 'big one' is coming because scores of new, smaller earthquakes pop up around the globe every year. Some say the next pandemic is overdue. Thankfully, most epidemics are stopped in their tracks by public health rapid response teams."

Unfortunately, and despite lessons learned from SARS, Ebola, and other outbreaks, the international response to COVID-19 was insufficient to stop the outbreak before it became the pandemic it is today.

COVID-19 has highlighted vulnerabilities in healthcare systems and infrastructure worldwide, and the USA is no exception. Despite the USA ranking high on the Global Health Security Index in regards to pandemic preparedness, the numbers show that the USA has not been as successful as other countries such as Germany and South Korea in its response. (Melllish, Luzmore, & Shahbaz, 2020) While the reason for this is multi-factorial, it is worth noting that the USA is one of the few high-income countries without universal healthcare coverage. In 2019, approximately fourteen percent of adults between the ages of eighteen and sixty-four were uninsured. (Center for Disease Control and Prevention, 2021) As one study pointed out, "COVID-19 has demonstrated that health care inequity in the US is a public health threat to the whole population." (Daszak, Keusch, Phelan, Johnson, & Osterholm, 2021)

It is also evident that in recent years the USA has not prioritized funding for situations like pandemic preparedness. In 2017, funding for research for pandemic prevention and emergency response structures was reduced or removed altogether. (Daszak, Keusch, Phelan, Johnson, & Osterholm, 2021) The 2019 report, "Crimson Contagion 2019 Functional Exercise Key Findings," highlighted that the USA had insufficient funding for a federal response to a severe influenza pandemic. (Melllish, Luzmore, & Shahbaz, 2020)

It perhaps should not be discounted that the COVID-19 pandemic also occurred during an election year in the USA, where the pandemic response became highly politicized. A lack of national leadership with a cohesive plan weakened the country's response and left many of the decisions with individual states. (Daszak, Keusch, Phelan, Johnson, & Osterholm, 2021) This highlights the importance for healthcare institutions to have their own policies and procedures for managing infectious disease threats, regardless of governmental action.

As mentioned above, in order to see an improvement in the nation's resilience to pandemic threats, it is vital that healthcare institutions be prepared for outbreaks of infectious diseases. Pre-incident planning is vital, enabling institutions to respond quickly and efficiently when an outbreak occurs. Once plans have been developed, monitoring and updating should occur on a regular basis, ensuring that the plans continue to meet the needs of the institution and the population that it serves. (Fifolt, Lee, Nafziger, & McCormick, 2021) Regular drills are also beneficial, to identify the strengths as well as any weaknesses. Drills also help prepare front-line staff and the various departments for real-time activation. (Fifolt, Lee, Nafziger, & McCormick, 2021) One method to assist with streamlining an institutions response to outbreaks is the development of algorithms that show how to implement the response plan while following current guidelines. (Fifolt, Lee, Nafziger, & McCormick, 2021)

The Cleveland Clinic proposed ten principles that should be utilized when developing an "all hazards" disaster plan that can be useful for institutions that are looking to develop or improve their pandemic preparedness. These principles are: do not wait, engage key stakeholders, identify sources of truth, promote creativity, prioritize hospital employee safety, prioritize collaboration, anticipate resource needs, prioritize mental health, anticipate ethical dilemmas,

and plan for recovery. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020) A closer look at each of these principles follows.

1) Do not wait. Create a generalized disaster plan with contingencies for specific threats. When a facility has disaster planning structures already in place, it is easier to adapt to a specific issue, like COVID-19. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
2) Engage key stakeholders. Work with key groups at the institutional, local and state levels, using an incident command system. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
3) Identify sources of truth. As misinformation is dangerous during a disaster event, it is critical identify and verify sources of information that can be used to safely guide decision making. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
4) Promote creativity. Innovation can make all the difference during times of crisis. This can be encouraged through scenario simulation with a multidisciplinary team, allowing them to think through possible scenarios and develop best practices. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
5) Prioritize hospital employee safety and well-being. Hospital employees are another resource that can be quickly depleted during a disaster if they are not provided with PPE and other equipment or resources they need to stay safe. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
6) Prioritize collaboration. As stated in the study: "Early organization, direct communication, and clarity of roles allow for effective mobilization of workers as a unified team and prevent duplicate or conflicting efforts." (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
7) Anticipate resource needs. Expect an increase in use of supplies accompanied by fractured supply chains and develop contingency plans to accommodate, which may include the reuse of normally single use PPE. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
8) Prioritize mental health. Epidemics and pandemics are stressful situations for everyone, and it is important to recognize that mental health will need to be addressed along with safety and physical well-being. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
9) Anticipate ethical dilemmas. Due to the nature of a disaster, health care workers may be faced with making decisions that seem at odds with their ethics. Developing policies and procedures to help determine care can remove some of the burden of decision making off providers. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)
10) Plan for recovery. Trying to anticipate what issues may be occur in long-term recovery can assist with plans for the initial response. (Orsini, Mireles-Cabodevila, Ashton, Khouli, & Chaisson, 2020)

Pre-incident response plans need to cover all aspects of patient care as well as facility operations. Several studies have been done that list areas of concern to be addressed by an institutions preparedness plan, with many aspects found to be in common. These areas include overall infrastructure and reconfiguration to meet possible surge needs, materials such as medical equipment and PPE, volunteers and workforce, and communication strategies. The Comprehensive Hospital Agile Preparedness (CHAPs) tool was developed to address these areas, and can be utilized by any healthcare institution. The six specific areas CHAPs addresses are: workforce; infrastructure; supplies and equipment; service reconfiguration; data and information technology; and communications. (Adelaja, et al., 2020) It is important to address all of these areas, as a disruption in one of them will affect all others. This tool makes suggestions for each area. For example, suggestions for the workforce include reallocation of staff, recall from retirement and recruitment of new staff. (Adelaja, et al., 2020) Another example in regards to infrastructure suggests that it may need to be changed to cohort patients with similar symptoms, and to make additional space for patient over-flow. (Adelaja, et al., 2020) In another study, a proposed checklist for pandemic preparedness also looked at the need to make preparations for managing visitors, providing adequate training for staff in infection prevention measures and PPE use, and dead body management. (Seyedin, Moslehi, Sahkaei, & Dowlati, 2021)

Disseminating the basics of the preparedness plan to employees is also important for ensuring its success. One study, detailing a particular institution's preparedness plan, described classes for front-line staff. These classes included information regarding highly infectious diseases, the efforts for preparedness being done at the hospital, and aspects of the plan. It also included instruction in the proper donning and doffing of PPE. It was expected that ninety percent of all front-line workers would attend these classes, thereby enhancing the facility's ability to respond quickly and efficiently when any outbreak might occur. (Popescu, Leach, & Robinson, 2021)

As seen in the above recommendations, preparing to respond to an epidemic or pandemic is time consuming and requires buy-in from all areas of a healthcare institution. It requires collaboration between all departments, from the laboratory and specimen collection to direct patient care to environmental services, etc. It can also be difficult to allocate the time and resources for a "what if" or "just in case" scenario, when there are often many other demands on the same time and resources. As observed in one study, "buying additional personal protective equipment and ventures to provide enhanced training for staff are not always a priority for hospital leadership, especially in times of economic strain and soaring health-care costs." (Popescu, Leach, & Robinson, 2021) However, the occurrence of the COVID-19 pandemic has shown that it is not an "if" but a "when" concern. The difficulties faced by many hospitals and regions not only in the USA but also worldwide have revealed gaps in the system that can be mitigated by adequate planning.

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